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मानक

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IS 15787 (2008): Switch-socket-outlets (non-interlock type)
[ETD 14: Electrical Wiring Accessories]



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भारतीय मानक
इंटरलॉक रहित स्विच-सॉकेट-आउटलेट

Indian Standard
SWITCH-SOCKET-OUTLETS
(NON-INTERLOCK TYPE)

ICS 621.316.541

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Electrical Wiring Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

Since many requirements and test methods relevant to different types of socket-outlets are similar, these have been covered in IS 1293 with the intention of covering specific requirement of individual type of socket-outlets in separate standards.

This standard is to be read in conjunction with IS 1293 : 2005 'Plugs and socket-outlets of rated voltage upto and including 250 volts and rated current upto 16 amperes (*third revision*)' to which reference has been given regarding general requirements as well as test method. Should, however, any deviations exist between IS 1293 and this standard, the provisions of the latter shall apply. Sequence of clauses used in this standard is the same as in IS 1293 for easy reference. Whenever particular requirement is not applicable to this type of socket-outlets, the same has been indicated accordingly. Any addition to the existing provisions of a sub-clause of IS 1293 has been indicated as under.

Addition: Followed by the text of the additional matter.

Clause/Tables which are additional to those of IS 1293 are numbered starting from **101** and additional sub-clauses are numbered with the main clause number followed by **101, 102** for example, **3.101**.

This standard is based on corresponding IEC Publication 60884-2-3 (1989) 'Specification for plugs and socket-outlets for household and similar purposes — Part 2-3: Particular requirements for switched socket-outlets with interlock for fixed installation'.

With the publication of this standard IS 4615 : 1968 'Specification for switch-socket-outlets (non-interlocking type)' shall be treated as withdrawn.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of this specified value in this standard.

Indian Standard

SWITCH-SOCKET-OUTLETS (NON-INTERLOCK TYPE)

1 SCOPE

This clause of IS 1293 is applicable except as follows:

Addition after the sixth paragraph:

This standard applies to fixed switched socket-outlets with out interlock for ac only, with or without earthing contact, with rated voltage not exceeding 440V and a rated current not exceeding 32A, intended for household and similar purposes, either indoors or outdoors.

Switched socket-outlets can also be produced by combining a socket as per IS 1293 and a switch as per IS 3854.

2 REFERENCES

This clause of IS 1293 is applicable, except as follows:

Addition:

IS No.	Title
302-1 : 2008	Safety of household and similar electrical appliances: Part 1 General requirements (<i>sixth revision</i>)
1293 : 2003	Plugs and socket-outlets of rated voltage upto and including 250 volts and rated current upto 16 amperes (<i>third revision</i>)
3854 : 1997	Switches for household and similar fixed-electrical installation (<i>second revision</i>)
8828 : 1996	Circuit breakers for over current protection for household and similar installation (<i>second revision</i>)
12640	Residual current operated circuit breakers for household and similar uses:
(Part 1) : 2000	Circuit-breakers without integral overcurrent protection (RCCBs)
(Part 2) : 2000	Circuit-breakers with integral overcurrent protection (RCCBs)
14772 : 2000	Enclosures for accessories for household and similar fixed electrical installations

3 TERMINOLOGY

This clause of IS 1293 is applicable, except as follows:

Additional sub-clauses:

3.101 Switched Socket-Outlet — A factory assembled unit consisting of a socket-outlet with an integral switch controlling the socket-outlet.

3.102 Multiple Switched Socket-Outlet — An accessory incorporating more than one switched socket-outlet, each socket-outlet being controlled by its own switch.

3.103 Switch — A device designed to carry or make or break the current in one or more electric circuits.

3.104 Operation — One operation is the transfer of the moving contacts from one operating position to another.

4 GENERAL REQUIREMENTS

This clause of IS 1293 is applicable.

5 GENERAL NOTES ON TESTS

This clause of IS 1293 is applicable, except as follows:

5.5 Addition:

Switched socket-outlets are deemed not to comply with this standard if sustained arcing occurs on any switch on a sample during any of the tests of 19.

6 RATINGS

This clause of IS 1293 is applicable except as follows:

Additional sub-clause:

6.101 Switches in socket-outlets shall have current and voltage ratings not less than the sockets they control.

7 CLASSIFICATION

This clause of IS 1293 is applicable, except as follows:

7.2 Additional sub-clauses:

7.2.101 Switched socket-outlets are classified:

a) According to the method of actuating the

switch:

- 1) Rotary switches;
- 2) Tumbler switches;
- 3) Rocker switches; and
- 4) Push-button switches.

b) According to the switching of the neutral:

- 1) Switched neutral; and
- 2) Unswitched neutral.

8 MARKING

The clause of IS 1293 is applicable, except as follows:

8.1 Addition after the seventh dash:

- symbol for mini-gap construction, if applicable.

8.2 Addition after the first explanatory matter:

Mini-gap construction	m
"off" position.....	O
"on" position.....	I

Additional sub-clauses:

8.101 Terminals intended for the connection of phase conductors shall be identified unless the method of connection is of no importance, is self-evident or is indicated in a wiring diagram. Such identification may take the form of a letter L or, in the case of more than one such terminal, the letters L1, L2, L3, etc. which may be accompanied by an arrow or arrows pointing to the relevant terminal or terminals.

Alternatively, the surface of such terminals shall be bare brass or copper, other terminals being covered with a metallic layer of another colour.

For two, three, and four-pole switches, terminals associated with any one pole shall have similar identification, if applicable, differing from that of the terminals associated with the other poles, unless the relationship is self-evident.

These indications shall not be placed on screws or any other easily removable parts.

8.102 Two, three and four-pole switches and switches having a rated voltage exceeding 250 V or a rated current exceeding 16 A shall be so marked that the direction of movement of the actuating member to its different positions or that the actual switch position is clearly indicated. For multiple switched sockets, this marking shall indicate, for each of the actuating members, the effects achieved by its operation.

The indications shall be clearly visible on the front of the switched socket when fitted with its cover or cover plate. If these indications are placed on the cover or cover plate, it shall not be possible to fix the cover or cover plate in a position such that the indications are incorrect.

For the indication of direction of movement of the operating means, symbols 'O' and 'I' may be used.

The short, straight line indicating the 'ON' position shall be radial for rotary switches, perpendicular to the axis of rotation of the dolly for tumbler switches and rocker switches, and vertical for push-button switches when mounted vertically.

8.103 BIS Certification Marking

The switched socket-outlets may also be marked with the Standard Mark.

8.103.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to the manufacturers or producers may be obtained from the Bureau of Indian Standards.

9 CHECKING OF DIMENSIONS

This clause of IS 1293 is applicable.

10 PROTECTION AGAINST ELECTRIC SHOCK

This clause of IS 1293 is applicable, except as follows:

Additional sub-clauses:

10.101 Knobs, operating levers, push-buttons, rockers and the like, for operating switches in switches socket-outlets shall be of insulating material, unless their accessible metal parts are separated from the metal parts of the mechanism by double insulation or reinforced insulation or as an alternative to switched socket-outlets with earthing terminals, they are reliably connected to earth.

Compliance is checked by inspection and by the tests of 17 and 21.

10.102 Metal parts of the switch mechanism, such as the spindle or the pivot of the dolly or rocker that are not insulated from live parts, shall not protrude from the enclosure.

Compliance is checked by inspection. If necessary, the actuating member may be removed or broken.

If the actuating member has to be broken, compliance is checked after the test of clause 28.

10.103 Metal parts of the switch mechanism, such as

the spindle or the pivot of the dolly or rocker, shall not be accessible when the switched socket-outlet is mounted as in for normal use.

In addition, they shall be insulated from accessible metal parts, including metal frames supporting the base of flush type switched socket-outlets, liable to be mounted in a metal box, and also from screws used for fixing the base to its support.

This additional requirement does not apply if the metal parts of the mechanism are separated from live parts in such a way that the creepage distances and clearances have at least twice the values specified in 27.1, or as an alternative for switches socket-outlets with earthing terminals, if they are reliably connected to earth.

Compliance is checked by inspection and, if necessary, by measurement and by the tests of 17 and 20.

11 PROVISION FOR EARTHING

This clause of IS 1293 is applicable.

12 TERMINALS

This clause of IS 1293 is applicable.

13 CONSTRUCTION OF FIXED SOCKET-OUTLETS

This clause of IS 1293 is applicable, except as follows:

Additional sub-clauses:

13.101 Switches shall be constructed to match the number of poles of the socket-outlets, except that the neutral pole is not switched in un-switched neutral socket-outlets.

The earthing contact is not considered as a pole and the earth circuit shall not be switched.

The position of the switch operating member shall be such that it does not prevent, nor shall its correct operation be prevented by, the proper insertion of the corresponding plug or plugs.

13.102 Knobs of rotary switches shall be securely coupled to the shaft or the part operating the mechanism.

The knob is subjected for 1 min to an axial pull of 100 N.

After this, knobs of switches having only one direction of operation are turned, if possible, without undue force, 100 times in the reverse direction.

During the test the knob shall not become detached.

13.103 The actuating member of a switch, when

released, shall automatically take up the position corresponding to that of the moving contacts, except that, for those with a single push-button, the actuating member may take up a single rest position.

13.104 Switches shall be so constructed that the moving contacts can come to rest only in the 'on' or 'off' position, an intermediate position being, however, permissible if it corresponds to the intermediate position of the actuating member and if the insulation between the fixed and moving contacts is then adequate.

If necessary, the insulation between the fixed and moving contacts, when in the intermediate position, is checked by applying a voltage of substantially sine-wave form, having a frequency of 50 Hz, for 1 min across the switch gap, the test voltage being 1 250 V for switch sockets having a rated voltage up to and including 130 V, or 2 000 V for accessories having a rated voltage exceeding 130 V.

Compliance with the requirements of 13.103 and 13.104 is checked by inspection and by manual test.

13.105 Switches shall be constructed so that undue arcing cannot occur when the switch is operated slowly.

Compliance is checked by causing the switch, at the end of the test of 21, to break the circuit a further ten times, the actuating member being, however moved steadily by hand over a period of 2 s and the moving contacts being stopped, if possible, in an intermediate position, the actuating member then being released.

During the test, no sustained arcing shall occur.

13.106 Switched socket-outlets with switches operating more than one pole shall make and break all poles virtually simultaneously, except that for multiple switches with switched neutral, the neutral shall not make after or break before other poles.

Compliance is checked by inspection and by a manual test.

13.107 The action of the mechanism, if the covers or cover plates are removable for installation purposes, shall be independent of the presence of the covers or cover plates.

Compliance is checked by connecting the switch, without cover or cover plate, if the switched socket-outlet with interlock in series with a lamp and by normally pressing the actuating member without undue force.

During the test, the lamp shall not flicker.

14 CONSTRUCTION OF PLUGS AND PORTABLE SOCKET-OUTLETS

This clause of IS 1293 is applicable.

15 INTERLOCKED SOCKET-OUTLETS

This clause of IS 1293 is not applicable.

16 RESISTANCE TO AGEING, TO HARMFUL INGRESS OF WATER AND TO HUMIDITY

This clause of IS 1293 is applicable.

17 INSULATION RESISTANCES AND ELECTRIC STRENGTH

This clause of IS 1293 is applicable, except as follows:

17.1 Replacement to the last sentence:

The insulation resistance shall be not less than 5 M Ω , except for items (g) and (h) of 17.1.1, where the resistance shall not be less than 2 M Ω .

17.1.1 Addition after the first explanatory matter:

For switches of switched socket-outlets the insulation resistance is measured consecutively:

- between all poles connected together and the body, with the switch in the 'on' position;
- between each pole in turn and all others connected to the body, with the switch in the 'on' position;
- between the terminals which are electrically connected together when the switch is in the 'on' position, the switch being in the 'off' position.

The term "body" includes accessible metal parts, metal frames supporting the base of flush-type switched socket-outlets, operating keys, metal foil in contact with the outer surface of accessible external parts and operating keys of insulating material, the point of anchorage of the cord, chain or rod for switches operated by such means, fixing screws of base or covers and cover plates, external assembly screws, earthing terminals and any metal part of the mechanism, if required to be insulated from live parts (see 10.102).

18 OPERATION OF EARTHING CONTACTS

This clause of IS 1293 is applicable.

19 TEMPERATURE RISE

This clause of IS 1293 is applicable.

20 BREAKING CAPACITY

This clause of IS 1293 is applicable except as

follows:

Addition:

Switches incorporated in switched socket-outlets shall have adequate making and breaking capacity.

The tests are made by means of an apparatus, the principle of which is as shown in Fig. 101 and which is arranged to simulate normal operation.

Switches are fitted with conductors as for the test of 19.

Switches are normally tested at 1.1 times the rated voltage and 1.25 times the rated current. They are subjected to 200 operations at a uniform rate of:

- 30 operations/minute, if the rated current does not exceed 10 A;
- 15 operations/minute, if the rated current exceeds 10 A but is less than 25 A; and
- 7.5 operations/minutes, if the rated current is 25 A or more.

For rotary switches intended to be operated in either direction, the actuating member is turned in one direction for half the total number of operations, and in the reverse direction for the remainder.

The test is carried out by using an alternating current ($\cos \phi = 0.6 \pm 0.05$).

During the test, the sample shall show no damage which may impair its further use.

21 NORMAL OPERATION

This clause of IS 1293 is applicable except as follows:

Addition:

Switches of switched socket-outlets shall withstand, without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use.

Compliance is checked by the following test:

The switches are tested at rated voltage and rated current ($\cos \phi = 0.6 \pm 0.05$) in the apparatus specified in 20.

The number of operations is as shown in Table 101.

The rate of operations is 15 operations/minute.

For rotary switches intended to be operated in either direction, three-quarters of the total number of operations are effected in the clockwise direction and the remainder in the reverse direction.

During the test, the sample shall function correctly.

After the test, the samples shall withstand an electric

strength test as specified in 17, and a temperature rise test as specified in 19, the test current being however, reduced to the rated current value.

The samples shall then not show:

- a) wear impairing their further use;
- b) discrepancy between the position of the actuating member and that of the moving contacts, if the position of the actuating member is indicated;
- c) deterioration of enclosures, linings or barriers to such an extent that the switch cannot be further operated or that the requirements of 10 are no longer complied with;
- d) loosening of electrical compound; and
- e) relative displacement of the moving contacts of switches.

The humidity treatment according to 16.3 is not repeated before the electric strength test of this sub-clause.

During the test, the samples are not lubricated.

22 FORCE NECESSARY TO WITHDRAW THE PLUG

The clause of IS 1293 is applicable.

23 FLEXIBLE CABLES AND THEIR CONNECTION

This clause of IS 1293 is not applicable.

24 MECHANICAL STRENGTH

This clause of IS 1293 is applicable.

25 RESISTANCE TO HEAT

This clause of IS 1293 is applicable.

26 SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS

This clause of IS 1293 is applicable.

27 CREEPAGE DISTANCE, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND

This clause of IS 1293 is applicable except as follows.

Additional sub-clause:

27.101 For switches incorporated in switched socket- outlets, creepage distances, clearances and distances through sealing compound shall be not less than the values shown in Table 102.

Compliance is checked by measurement.

28 RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING

This clause of IS 1293 is applicable.

29 RESISTANCE TO RUSTING

This clause of IS 1293 is applicable.

30 ADDITIONAL TESTS ON PINS PROVIDED WITH INSULATING SLEEVES

This clause of IS 1293 is not applicable.

31 TESTS

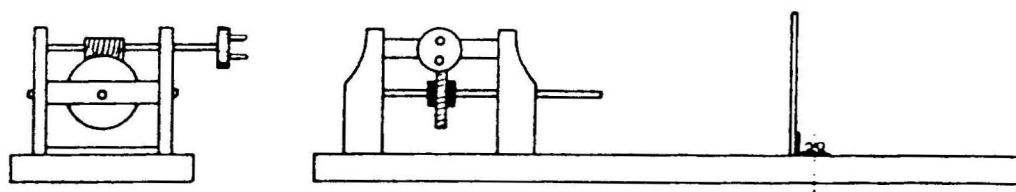
This clause of IS 1293 is applicable.

Table 101 Number of Operations for Normal Operation
(Clause 21)

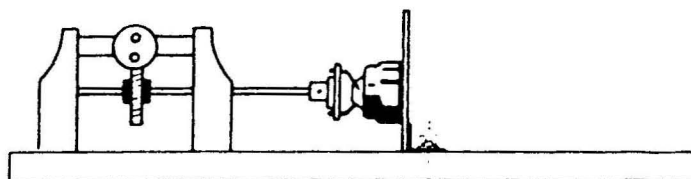
Sl No.	Rated Current	Number of Operations
(1)	(2)	(3)
i)	Up to and including 16 A for switches having a rated voltage not exceeding 250 V ac	40 000
ii)	Up to and including 16 A for switches having a rated voltage exceeding 250 V ac	20 000
iii)	Over 16 A up to and including 32 A	10 000

Table 102 Creepage, Clearance and Distances Values
(Clause 27.101)

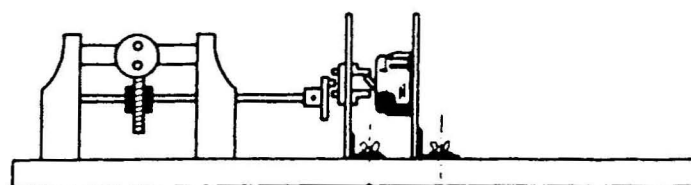
Sl No.	Description	Mm
(1)	(2)	(3)
i)	<i>Creepage distance:</i>	
a)	between live parts which are separated when the contacts are open;	3
b)	between live parts and; — metal parts of the mechanism, if required to be insulated from live parts (see sub-clause 10.102);	3
c)	between metal parts of the mechanism, if required to be insulated from accessible metal parts (see sub-clause 10.103) and ;	3
	1) screws or devices for fixing bases, covers or cover plates.	
	2) metal frames supporting the base of flush-type switches.	
	3) accessible metal parts.	
ii)	<i>Clearance:</i>	
a)	between live parts which are separated when the contacts are open;	3 ¹⁾
b)	between live parts of the mechanism, if required to be insulated from accessible metal parts (see sub-clause 10.102);	3
c)	between metal parts of the mechanism, if required to be insulated from accessible metal parts (see sub-clause 10.103) and;	3
	1) screws or devices for fixing bases, covers or cover plates,	
	2) metal frames supporting the base of flush-type switches,	
	3) accessible metal parts.	
¹⁾ This value is reduced to 1.2 mm, when the contacts are open, for live parts of switches of mini-gap construction which are moved during the separation of the contacts.		
NOTE — Compliance is checked by measurement.		



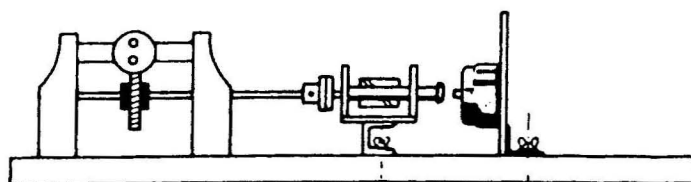
Driving mechanism



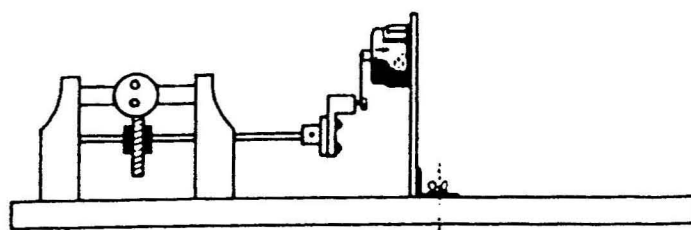
Arrangement for rotary switches



Arrangement for tumbler switches



Arrangement for rocker switches and push-button switches



Arrangement for cord-operated switches

FIG. 101 APPARATUS FOR TESTING THE MAKING AND BREAKING CAPACITY AND THE NORMAL OPERATION OF SWITCHES IN SWITCHED SOCKET-OUTLETS

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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